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Effect of Spraying Some Amino Acids and Seaweed Extract on the Yield and Quality Fruits of Valencia Orange

Huda M.H. Ismaiel * and Hassan S.H. Ismail
Citriculture Research Department, Horticulture Research Institute, Agricultural Research Center, Giza, Egypt.

VALENCIA orange trees were dosed with 0.05 to 0.2% concentrations of various amino acids (Arginine, tryptophan, and glutamine) and/or seaweed extracts three times throughout the 2021 and 2022 growing seasons. The value of this research is in its investigation of how spraying varying concentrations of amino acids and seaweed extracts affects the development, nutritional status, production, and quality of Valencia oranges. In comparison to the control treatment, trees given three applications of 0.05 to 0.2% amino acids and/or seaweed extracts showed significant improvements in growth, leaf pigments and nutrients, yield, and physical and chemical fruit attributes. Concentration rose in tandem with the ad campaign's success. The effects of the higher doses (0.1 and 0.2 percent) on these indicators were negligible. Using specific amino acids(Arginine, tryptophan, and glutamine) was far more effective than using seaweed extracts, and using both together was more effective than using each one by itself across the board. a combination of amino acids and seaweed extracts at 0.2 percent applied three times: at the beginning of development, immediately after fruit setting, and again two months later was more recommended.

Keywords: Valencia Orange Trees- Some Amino Acids – Seaweed Extracts- Yield- Fruit Quality.

Introduction

Citrus fruit is One of Egypt's most valuable fruit harvests. The Valencia cv. orange tree is widely regarded as the finest orange cv. for both domestic and international sales. The total area used for citrus fruiting in Egypt is 440210 feddan, and in that time it produced 4503226 metric tons of fruit. In 126907 feddan, or around 24.16 percent of the total fruiting area that was grown with citrus, Valencia orange trees were planted. There are 129,685 tons of oranges produced by Valencia orange trees. (2021, Annual Reports).

Antioxidant amino acids are crucial to a plant's ability to fend off the oxidative damage caused by environmental stresses. Amino acid spraying improved protein quality, shielded plant cells from premature ageing and death, blocked free radicals from damaging membrane lipids (a factor in plasma membrane permeability loss), and regulated the occurrence of diseases.(Orth et al., 1993)

Proteins are synthesised by the ribosome catalysing the polymerization of a subset of amino acids, which are themselves organic nitrogenous compounds. (Davis, 1982 and Raskin, 1992).

Many hypotheses have been put up to try to explain why amino acids are so important to plants. The research so far supports many potential pathways, beginning with amino acids, by which plants may synthesise IAA and ethylene. (Hashimoto and Yamada, 1994 and Taiz and Zeiger , 2002).

Relying on Amino Acids according to (Rizk, 2013; El- Balady and Abd El- aal, 2013 , Ahmed et al., 2013; Ibrahiem et al., 2013 ; Hassan, 2014; El- Khawaga,2014; Mohamed, 2017; Abdel –Aziz et al. ,2017; Mahmoud, 2018 and Awad,2017).

*Corresponding author: Huda M.H. Ismaiel, E-mail: huda_sps122@hotmail.com, Tel. 01061839102
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The application of seaweed extracts, which contain some micronutrients (Co, Mo, B, Cu, and Zn) as well as macronutrients, gibberellins, auxins, and cytokines, has been shown to increase the root ability for growth and nutrient uptake (Jensen, 2004). This has been shown to improve overall fruit crop performance (Aitken and Senn, 1965). These extracts improve the vitamin, cytokinin, and trace nutrient absorption and utilisation by plants, which in turn boosts plant growth, production, and fruit quality. There are a variety of seaweed extracts in the market now (Jeanin et al., 1991). Hormones (IBA and IA), trace elements (Mn and Ni), and a few amino acids were extracted from seaweed as (Challan and Hemingway, 1965; Cabrera et al., 2003; Gamal,2006; Ahmed et al., 2008 and Abdel- Aal et al., 2012). The study›s goal was to see whether supplementing Valencia orange trees with an amino acid or seaweed extract would increase the plants› health generally, growth, production, and quality.

Materials and Methods

Thirty uniform Valencia orange trees grown in the Orchard of the Agricultural research station in the Mallawy area of the Minia Governorate, Egypt were used for this investigation which was conducted in 2021-2022. Trees were all 35 years old, grafted onto sour orange rootstock.

The orchard›s soil was well-drained clay with a water table not less than two meters deep, and the trees were planted using the square arrangement technique with a spacing of 6.0 × 6.0 meters apart (116 trees/ fed.). The Nile water was used to irrigate the using surface irrigation.

The chosen Valencia orange trees received the same management practices i.e. fertilization, irrigation , pruning pest control et. as the rest of the trees in the orchard.

Analysis of the tested soil was conducted according to the procedures that are outlined by Table 1 (Wilde et al., 1985).

The following ten foliar treatments were applied for three times on three specific as follows:

1- Control (water sprayed).

2- Spraying some amino acids at 0.05 % (0.5 g/L).

3- Spraying some amino acids at 0.1 % (1.0 g/L).

4- Spraying some amino acids at 0.2 % (2.0 g/L).

5- Spraying seaweed extracts at 0.05 %.

6- Spraying seaweed extracts at 0.1 %.

7- Spraying seaweed extracts at 0.2 %.

8-Spraying some amino acids and seaweed extract each at 0.05%.

9- Spraying some amino acids and seaweed extract each at 0.1%.

10- Spraying some amino acids and seaweed extract each at 0.2%.

One tree was subjected to each treatment three times. Three times a year, seaweed extracts and amino acids (arginine, tryptophan, and glutamine) were sprayed. After fruit setting (in the last week of April), during the height of growth (in the first week of May), and two months later (in the last week of June). Triton B, a wetting agent, is included in all the treatments, and spraying was done until runs off. Methods used an CRBD (complete randomized block design) .

During the experiment, the following parameters were assessed as follows :

1- Spring growth flush measured , four branches (about one inch in thickness) around a round main direction of the tree were tagged, then, 10 non fruiting flushes / shoot were selected. Seasonally, at mid of September, average of shoot length & thickness (in cm) and leaf area (in cm2), according to (Ahmed and Morsy, 1999).

2- At mid of September / season, ten leaves / tree (the 3rd leaf for spring non fruiting flushes) were picked, cleaned, cutting up and 0.5g f.w were taken, were extracted and determined Chlorophylls (a, b and , total) and total carotenoids (in millimoles per grammes fresh weight) in leaves, (Von-Wettstein, 1957).

3-Total carbohydrates % in the leaves (Smith et al., 1956)

4-Springtime leaf N, P, and K concentrations in non-fruiting shoots (Summer , 1985 and Wilde et al., 1985).

5-Initial fruit setting and retention expressed as a percentage , At the 1st week of March four branch / replicate (about 1 inch in thickness) were carefully selected and tagged around the tree canopy up to 2 M height from the soil surface (one branch / the main direction). At full-bloom stage total flowers / branch were counted and recoded, then, at petal-fall stage total fruit-let / branch were counted and recorded for initial fruit-set estimation as follow:

$$\text{Initial fruit set \%} = \frac{\text{Total fruit}}{\text{Total flower}} \times 100$$

After June-drop (at the 4th week of June), fruits were counted for fruit-let calculated as follow:

$$\text{Fruit let \%} = \frac{\text{Total fruit let} \times 100}{\text{Total flowers}}$$

6- Yield in Kg / tree and number / tree.

7- Fruit Weight (g.), length (cm), diameter (cm), percentages of peel weight and pulp, and peel thickness (in mm).

8-The percentages of total and reducing sugars (T.S.S.) ,acidity

% (as g, citric acid/ 100 ml juice); TSS acid ratio (Lane and Eynon, 1965) and vitamin C content (mg/100 ml juice) (A.O.A.C., 2000).

The complete randomized block design For all statistical comparisons among the 10 treatment groups, New L.S.D. was used at a probability of 5%. According to (Mead et al., 1993) in both seasons.

Results and Discussion

Shoot length and leaf area

Table 2 shows that various amino acids (Arginine, Tryptophan, and glutamine) and seaweed extracts at 0.05, 0.1, and 0.2 percent substantially enhanced growth characteristics, namely shoot length and leaf area, when compared to the control treatment. There was a correlation between the stimulation and increase in concentration used. In this regards, employing amino acids was far better than using seaweed extract. Additionally, a combination of both substances was far more advantageous than either material alone. The best results were achieved when a combined treatments of amino acids and 0.2 percent seaweed extract was used (11.2: 11.5 cm) and (28.95: 29.35cm2). The untreated trees had the lowest averages (6.4: 6.6 cm) and (21.22 :21.52 cm2) .Both experimental seasons had the same findings at 5% new L.S.D..

Chemical constituents of leaves

Tables 2 and 3 show that compared to control, applying 0.05–0.2% of a variety of amino acids (Arginine, Tryptophan, and glutamine) and/ or seaweed extract significantly increased leaf chlorophyll a, b, total chlorophylls(2.31: 2.43mg), total carotenoids (0.81: 0.91mg), total carbohydrates (35.0 : 35.8 %), N (1.93: 1.96%), and K (1.42: 1.44%)levels in Valencia orange trees in both seasons. These chemical components of leaves were promoted gradually, with increasing concentrations ranging from 0.05 to 0.2 percent for various amino acids and seaweed extract. When compared to utilizing seaweed extract, employing specific amino acids was far preferable. The use of both materials together was more effective than either alone. The most impressive benefits were seen in trees that had been treated three times with a 0.2% concentration of amino acids and seaweed extract. The averages for untreated trees were the lowest. These results were corroborated by the weather in 2020, 2021, and 2022.

Percentages of fruit setting and yield per tree:

According to Table 4, both individual and combined applications of certain amino acids (Arginine, Tryptophan, and glutamine) and/or seaweed extract at 0.05 to 0.2 percent significantly increased the initial fruit setting, fruit retention, number of fruits per tree, and yield per tree (kg.) of Valencia orange trees compared to the control treatment. An increase in concentration was directly correlated to a promotion in status. There was no discernible marketing benefit from raising concentrations from 0.1 to 0.2 percent. It is recommended, therefore, to employ 0.1 percent seaweed extracts and amino acids to get the same effect while keeping costs down. When compared to employing seaweed extracts, the use of certain amino acids was also better. It was more effective to use them together than to use them alone to boost yield. When given the therapy that was promised (Spraying three times with specific amino acids and seaweed extract at each of 0.2 percent), the yield per tree increased to 69.78, 72.83 kg in both seasons, respectively, whereas the yield per untreated tree increased to 47.09, 49.00 kg.. The stated results for both seasons were identical.

Physical and chemical characteristics of the fruits

The physical and chemical characteristics of Valencia oranges were greatly enhanced after being sprayed with a solution of amino acids and/or seaweed extract ranging from 0.05 percent to 0.2 percent, as shown in Tables 5 and 6. The fruits' total soluble solids (TSS), total sugars , and vitamin C content, as well as their weight, height, and diameter, were all increased. Increasing concentration of used amino acids and seaweed extracts were correlated with positive effects on fruit quality. In terms of improving fruit quality, employing certain amino acids was far more effective than using seaweed extract.

When applied together, used amino acids and seaweed extracts much outperformed their individual administrations in improving the fruit's physical and chemical qualities. The optimum fruit quality was achieved by treating the trees three times with a combination of 0.2 percent seaweed extracts and some amino acids (Arginine, Tryptophan, and glutamine). The fruit quality was much lower when the trees weren't treated. The data held true in both seasons.

Discussion

Evidence suggests that a few specific amino acids, specifically those involved in the biosynthesis of plant pigments, proteins, natural hormones, vitamins, and organic foods; the enhancement of plant resistance to various stresses; and the stimulation of cell division all play a role in promoting Valencia orange tree development and fruiting (Sies, 1997)

The antioxidative capabilities of amino acids are crucial in plant defense against the oxidative stress caused by unfavorable environmental circumstances. Using certain amino acids has been linked to improved protein production, protection of plant cells from senescence, suppression of disease prevalence, and protection of plasma membrane lipids from free radical oxidation and the loss of permeability that results from it (Orth et al., 1993).

IAA, ethylene, GA3 natural hormones, cytokinins, cell division, enzymes, DNA, and RNA are all made or stimulated by amino acids. The results of these benefits may be seen in the trees› improved health (Vianello and Marci, 1991).

Certain amino acids serve as building blocks in the process by which ribosomes catalyse the polymerization of amino acids during protein synthesis (Davies, 1982 and Raskin, 1992). The findings provide credence to the hypothesis that certain amino acids have a stimulatory influence on the development, productivity, and fruit quality of Valencia orange plants. There is a wealth of material available on the subject (El- Badawy and Abd El-aal, 2013; Fathalla, 2013; Rabeh et al., 2014; Gamal, 2006; Mohamed and Qaoud, 2014).

Effect of seaweed extracts

Natural hormones including IAA, GA3, and cytokinins are important for stimulating all growth aspects and delaying leaf ageing, which may explain why seaweed extract has a positive influence on growth, yield, and fruit quality features. Antioxidants, proteins, a small number of amino acids, and glutathione are all present. There are also certain vitamins, enzymes, coenzymes, another macro and micro nutrients, and more. In addition, by facilitating the release of CO2, it plays a crucial role in the production of protoporphyrin, a precursor of photosynthetic pigments and photosynthesis (Norric et al, 2002 and Aziz et al., 2003).

These findings corroborate those obtained by regarding the impact of seaweed extracts on the development, production, and quality of the studied fruit crops (Ebeid- Sanaa 2007; Mouftah, 2007 Mohamed et al., 2012, Oraby, 2013 and Ahmed et al., 2018).

According to the above, after using the foliar application of treatments on Valencia orange trees, it became clear that the control treatment (spraying with water) had less results in terms of fruit quality and yield, and the increase was variable and not significant when using each of the amino acids and seaweed extract separately at a concentration of 0.05 , 0.1 and 0.2%, but when both amino acids and seaweed extract were used together at a concentration of 0.05, 0.1 and 0.2%, the increase was incremental and significant on both the physical and chemical properties of the fruits and the yield during the two study seasons 2021 and 2022. The results were recommended when spraying throughout the growing season on trees both amino acids and seaweed extract at 0.2% as a foliar application according to tables 2,3,4,5 and 6.

TABLE 1. Analysis of the tested soil

Constituents	Values	Constituents	Values
Clay %	81.0	O.M. %	2.20
Silt %	14.5	Available N %	0.09
Sand %	4.5	Available P (ppm)	6.8
Texture	Clay	Available K (ppm)	458.0
$CaCO_3$ %	1.19		
pH (1:2.5 extract)	7.98		
E.C.(1:2.5extract)(mmos/cm/25^{0}C)	0.89		

TABLE 2. Effect of single and combined applications of some amino acids and seaweed extracts on shoot length, leaf area, chlorophylls a, b , and total chlorophylls of Valencia orange trees during 2021 and 2022 seasons.

Treatments	Shoot length (cm)		Leaf area (cm2)		Chlorophyll a (mg/ g F.W.)		Chlorophyll b (mg/ g F.W.)		Total chlorophylls (mg/ g F.W.)	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Control	6.4	6.6	21.22	21.52	1.11	1.13	0.56	0.58	1.67	1.71
Some amino acids at 0.05%	7.3	7.5	24.50	25.20	1.21	1.22	0.66	0.68	1.87	1.90
Some amino acids at 0.1%	7.7	7.9	25.60	26.00	1.24	1.25	0.71	0.73	1.95	1.98
Some amino acids at 0.02	8.0	8.2	27.0	27.30	1.27	1.29	0.75	0.77	2.02	2.06
Seaweed extracts at 0.05%	6.8	7.0	22.10	23.30	1.16	1.17	0.61	0.63	1.77	1.80
Seaweed extracts at 0.1%	7.1	7.3	23.15	24.00	1.19	1.21	0.65	0.68	1.84	1.89
Seaweed extracts at 0.2%	7.3	7.4	23.80	24.30	1.21	1.23	0.68	0.71	1.89	1.94
Some amino acids + seaweed extracts each at 0.05%	9.0	9.1	27.10	28.00	1.30	1.33	0.77	0.79	2.07	2.12
Some amino acids + seaweed extracts each at 0.1%	9.9	10.2	28.18	28.95	1.33	1.40	0.81	0.83	2.14	2.23
Some amino acids + seaweed extracts each at 0.2%	11.2	11.5	28.95	29.35	1.41	1.48	0.90	0.95	2.31	2.43
New L.S.D. at 5%	0.3	0.4	0.22	0.28	0.08	0.09	0.05	0.07	0.13	0.15

TABLE 3. Effect of single and combined applications of some amino acids and seaweed extracts on total carotenoids, total carbohydrates % and percentages of N, P and K in the leaves. of Valencia orange trees during 2021 and 2022 seasons.

Treatments	Total carotenoids (mg/ g F.W.)		Total carbohydrates %		Leaf N %		Leaf p %		Leaf K %	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Control	0.53	0.55	26.1	26.3	1.56	1.58	0.16	0.17	1.11	1.13
Some amino acids at 0.05%	0.64	0.66	30.0	30.6	1.70	1.72	0.26	0.27	1.21	1.22
Some amino acids at 0.1%	0.69	0.71	31.4	31.8	1.78	1.80	0.29	0.31	1.26	1.28
Some amino acids at 0.02	0.71	0.74	32.6	33.0	1.82	1.84	0.36	0.37	1.31	1.33
Seaweed extracts at 0.05%	0.58	0.61	27.5	28.0	1.61	1.63	0.19	0.20	1.14	1.18
Seaweed extracts at 0.1%	0.61	0.64	28.3	28.9	1.66	1.69	0.22	0.23	1.17	1.19
Seaweed extracts at 0.2%	0.63	0.66	29.2	30.0	1.71	1.73	0.25	0.26	1.19	1.21
Some amino acids + seaweed extracts each at 0.05%	0.79	0.81	33.0	33.8	1.86	1.89	0.41	0.42	1.34	1.36
Some amino acids + seaweed extracts each at 0.1%	0.83	0.85	34.2	35.1	1.91	1.94	0.49	0.50	1.38	1.39
Some amino acids + seaweed extracts each at 0.2%	0.81	0.91	35.0	35.8	1.93	1.96	0.56	0.58	1.42	1.44
New L.S.D. at 5%	0.07	0.06	0.3	0.4	0.03	0.04	0.02	0.03	0.03	0.04

TABLE 4. Effect of single and combined applications of some amino acids and seaweed extracts on the percentages of initial fruit setting and fruit retention as well as yield/ tree and fruit weight of Valencia orange trees during 2021 and 2022 seasons.

Treatments	Initial fruit setting %		Fruit retention %		Number of fruits/ tree		Yield/ tree (kg)		Fruit weight (g)	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Control	11.8	11.9	1.81	1.88	345.0	350.0	47.09	49.00	136.5	170.0
Some amino acids at 0.05%	12.8	13.0	2.11	2.13	375.0	378.0	54.38	55.94	145.0	148.0
Some amino acids at 0.1%	13.9	14.1	2.22	2.25	381.0	385.0	57.72	58.71	151.5	152.5
Some amino acids at 0.02	14.5	14.7	2.26	2.28	388.0	390.0	60.14	60.84	155.0	156.0
Seaweed extracts at 0.05%	12.1	12.2	1.95	1.99	356.0	361.0	49.84	51.26	140.0	142.0
Seaweed extracts at 0.1%	12.4	12.5	1.99	2.06	362.0	365.0	52.31	53.29	144.5	146.0
Seaweed extracts at 0.2%	12.9	13.1	2.05	2.11	370.0	375.0	54.76	56.33	148.0	150.2
Some amino acids + seaweed extracts each at 0.05%	15.2	15.5	2.29	2.31	392.0	396.0	61.94	63.56	158.0	160.5
Some amino acids + seaweed extracts each at 0.1%	16.1	16.8	2.41	2.46	400.0	409.0	64.60	67.23	161.5	166.0
Some amino acids + seaweed extracts each at 0.2%	17.1	17.5	2.50	2.52	410.0	415.0	69.78	72.83	170.2	175.5
New L.S.D. at 5%	0.4	0.4	0.07	0.09	6.8	7.1	2.5	2.6	6.2	6.6

TABLE 5. Effect of single and combined applications of some amino acids and seaweed extracts on some physical characteristics of the fruits of Valencia orange trees during 2021 and 2022 seasons.

Treatments	Fruit diameter (cm)		Fruit height (cm)		Fruit peel weight %		Fruit peel thickness (mm)		Juice %	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Control	6.4	6.3	7.6	7.5	29.0	28.6	4.1	3.9	38.0	38.5
Some amino acids at 0.05%	7.0	7.0	8.2	8.2	25.2	25.0	3.6	3.5	41.2	42.0
Some amino acids at 0.1%	7.3	7.4	8.4	8.5	24.1	24.0	3.4	3.3	43.0	43.8
Some amino acids at 0.02	7.5	7.6	8.5	8.6	23.5	23.2	3.2	3.1	44.5	45.2
Seaweed extracts at 0.05%	6.8	7.0	7.9	8.0	27.5	27.2	3.9	3.8	38.9	39.5
Seaweed extracts at 0.1%	6.9	7.0	8.1	8.2	26.2	25.6	3.7	3.6	39.6	40.5
Seaweed extracts at 0.2%	7.1	7.2	8.3	8.4	25.3	24.8	3.6	3.5	40.0	41.0
Some amino acids + seaweed extracts each at 0.05%	7.6	7.7	8.6	8.7	23.2	23.0	3.0	2.9	45.0	45.8
Some amino acids + seaweed extracts each at 0.1%	7.8	7.8	8.7	8.8	22.0	21.6	2.8	2.6	47.5	48.0
Some amino acids + seaweed extracts each at 0.2%	8.0	8.0	8.8	8.9	21.3	21.0	2.6	2.5	48.0	48.5
New L.S.D. at 5%	0.2	0.3	0.3	0.4	0.8	0.9	0.2	0.2	0.7	0.8

TABLE 6. Effect of single and combined applications of some amino acids and seaweed extracts on some chemical characteristics of the fruits of Valencia orange trees during 2021 and 2022 seasons.

Treatments	TSS%		Total acidity %		TSS/ acid		Total sugars %		Reducing sugars %		V.C. content (mg/ 100 ml juice)	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Control	10.8	11.0	1.35	1.36	8.0	8.1	6.9	7.0	3.1	3.3	46.0	46.5
Some amino acids at 0.05%	11.6	11.7	1.18	1.16	9.8	10.1	7.8	7.9	3.9	4.0	49.0	49.5
Some amino acids at 0.1%	11.9	12.0	1.06	1.03	11.2	11.6	8.0	8.2	4.2	4.3	51.0	51.6
Some amino acids at 0.02	12.1	12.3	1.00	1.00	12.1	12.3	8.2	8.4	4.4	4.6	51.6	52.0
Seaweed extracts at 0.05%	11.1	11.3	1.28	1.23	8.6	9.2	7.3	7.4	3.4	3.6	47.5	47.8
Seaweed extracts at 0.1%	11.3	11.6	1.22	1.19	9.2	9.7	7.5	7.6	3.6	3.8	48.0	48.8
Seaweed extracts at 0.2%	11.5	11.7	1.19	1.14	9.7	10.2	7.7	7.8	3.9	4.1	48.8	49.4
Some amino acids + seaweed extracts each at 0.05%	12.4	12.6	0.95	0.92	13.0	13.7	8.4	8.5	4.6	4.7	52.5	52.9
Some amino acids + seaweed extracts each at 0.1%	12.7	13.0	0.88	0.85	14.4	15.3	8.6	8.8	4.8	5.0	54.0	54.6
Some amino acids + seaweed extracts each at 0.2%	12.9	13.2	0.83	0.81	15.5	16.2	8.9	9.1	5.1	5.2	55.0	55.5
New L.S.D. at 5%	0.3	0.4	0.06	0.07	0.5	0.6	0.3	0.4	0.2	0.3	0.6	0.7

Conclusively

The results indicate that Valencia orange trees benefit from a combination of 0.2 percent seaweed extract and the amino acids arginine, tryptophan, and glutamine applied three times throughout the growing season (at the beginning, immediately after fruit setting, and two months later).

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Conflicts of interest

The authors declare that they have no competing interests.

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تأثير الرش ببعض الأحماض الأمينية ومستخلص الأعشاب البحرية على كمية المحصول وجودة ثمار البرتقال الفالنشيا

هدى محمد حسن إسماعيل و حسن سليمان حسن اسماعيل
*قسم بحوث الموالح- معهد بحوث البساتين- مركز البحوث الزراعية- الجيزة- مصر.

خلال موسمى ٢٠٢١ و ٢٠٢٢ تمت معاملة أشجار البرتقال الفالنشيا ثلاثة مرات خلال موسمي النمو ببعض الأحماض الأمينية (الأرجينين والتربتوفان والجلوتامين) ومستخلص الأعشاب البحرية بصورة فردية أو مشتركة بتركيز ما بين ٠,٠٥ الى ٠,٢٪ لكلا منهما.

وكان الهدف إختبار التأثير الفردى والمشترك لإستخدام بعض الأحماض الأمينية ومستخلص الأعشاب البحرية على النمو والحالة الغذائية للأشجار والمحصول وجودة ثمار البرتقال الفالنشيا .

كانت معاملة الأشجار ببعض الأحماض الأمينية ومستخلص الأعشاب البحرية ثلاث مرات بتركيز ما بين ٠,٠٥ الى ٠,٢٪ فعالا جدا فى تحسين خصائص النمو الخضرى ومحتوى الورقة من الصبغات والعناصر الغذائية وكمية المحصول والخصائص الطبيعية والكيميائية للثمار وذلك بالمقارنة بالغير المعاملة وكانت الزيادة مرتبطة مع زيادة التركيزات .

وكان التحسن طفيفا فى تلك الصفات ما بين التركيزين الأعلى (٠,١ ٪ و ٠,٢٪) ولقد تفوق رش بعض الأحماض الأمينية عن مستخلص الأعشاب البحرية كما تفوق الإستخدام المشترك عن الإستخدام الفردى لهاتين المادتين فى كل الصفات.

التوصية: أمكن الحصول على أفضل النتائج بخصوص كمية المحصول وخصائص الجودة لثمار البرتقال الفالنشيا وذلك عند رش الأشجار ببعض الأحماض الأمينية (الأرجينين ، التربتوفان ، والجلوتامين) مع مستخلص الأعشاب البحرية بتركيز ٠,٢٪ لكلا منهما ثلاث مرات فى بداية النمو وبعد العقد مباشرة وبعدها بشهرين .

الكلمات الدالة: أشجار البرتقال الفالنشيا- بعض الأحماض الأمينية - مستخلص الأعشاب البحرية- كمية المحصول- خصائص جودة الثمار.